Making Forest Soil Maps Work

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What brings you here today?

A. CONSULTANT
B. TIMO-INDUSTRY
C. ACADEMIA-STUDENT
D. LANDOWNER
E. PUBLIC –STATE-FEDERAL

Soil Maps for Silviculture

- **Public – NRCS**
  - Web soil survey
  - Online WSS tool or
  - Download using the Geospatial data gateway
  - ArcGIS Ready-to-Use Map Layers and Tools

***websoilsurvey**.nrcs.usda.gov/*

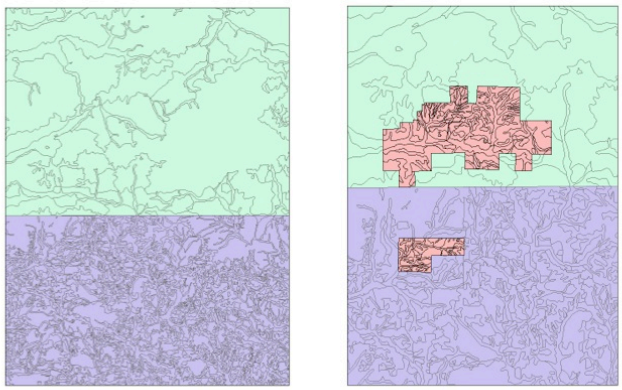
Soil Maps for Silviculture

- **Legacy**
  - IP (consolidated) SAISS
  - Coile
  - Boise
  - MWV
- **Proprietary**
  - Crown Pine
  - Plum Creek
  - Rayonier
  - Superior Pine
  - Westervelt
  - Weyerhaeuser

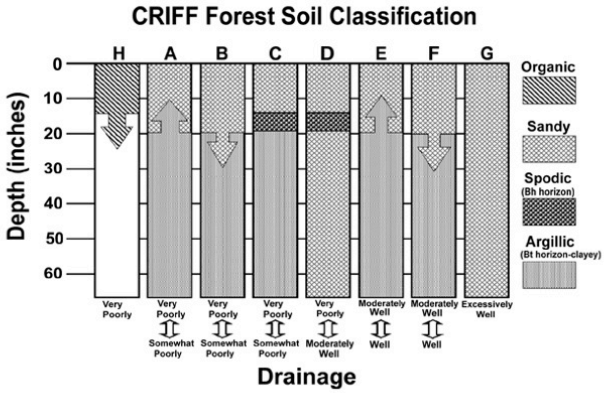
Test the Maps

- Test the soil polygons against the land
- Develop soil management groups
- Develop and test keys that query polygons by soil management group
- Test and refine keys against the land

Do the soil polygons match the land?



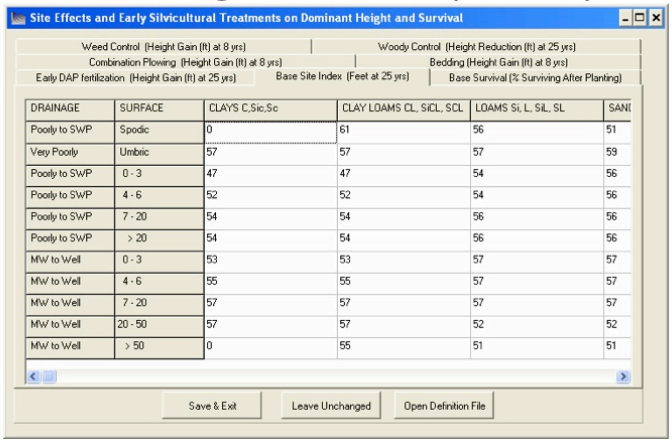
Soil Management Group Example



Soil Management Group Example

- Upland Soils
  - Thick surfaced uplands
  - Thin surfaced uplands
  - Clayey uplands
  - Wet uplands
- Flatwoods Soils
  - Dry flatwoods
  - Wet flatwoods
- Rivers & Stream Soils
  - High terraces (non – flooding)
  - Hardwood soils
- Badlands
  - Excessively wet soils
  - Excessively dry soils
  - Rotten soils (high pH, deficiencies, salt)

Soil Management Group Example



DRAINAGE	SURFACE	CLAYS C,Sic,Sc	CLAY LOAMS CL, SiCL, SCL	LOAMS Si, L, SiL, SL	SANI
Poorly to SWP	Spodic	0	61	56	51
Very Poorly	Umbric	57	57	57	59
Poorly to SWP	0 - 3	47	47	54	56
Poorly to SWP	4 - 6	52	52	54	56
Poorly to SWP	7 - 20	54	54	56	56
Poorly to SWP	> 20	54	54	56	56
MW to Well	0 - 3	53	53	57	57
MW to Well	4 - 6	55	55	57	57
MW to Well	7 - 20	57	57	57	57
MW to Well	20 - 50	57	57	52	52
MW to Well	> 50	0	55	51	51

What is your physiographic province?

A. Ridge & Valley – Appalachian plateau

B. Piedmont

C. Upper Coastal Plain and Sandhills

D. Atlantic Flatwoods

E. East Gulf Coastal Plain

What is your physiographic province?

A. Loess Capped Hills

B. Western Gulf Flatwoods

C. Upper Gulf Coastal Plain

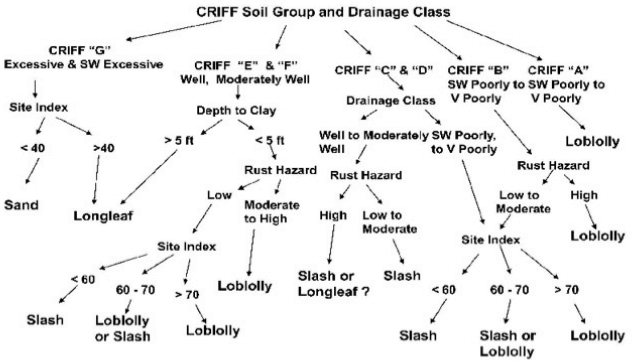
D. Interior Flatwoods

E. Ouachita Mountains

Develop and test keys that query polygons by soil management group

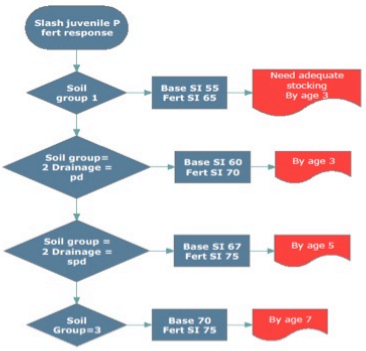
- Assign each map unit to a SMG
- Assign decision support to each SMG
  - Species
  - Tillage
  - Fertilization
  - Operability
  - Hazards
  - etc

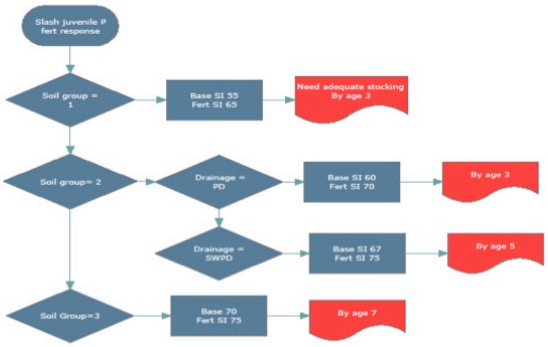
Species Deployment Decision Key for Southern Pines the Coastal Plain of Georgia, Florida and Alabama (From: Fox 2004)



Note: Soils in CRIFF Group H are generally not well suited for pine management

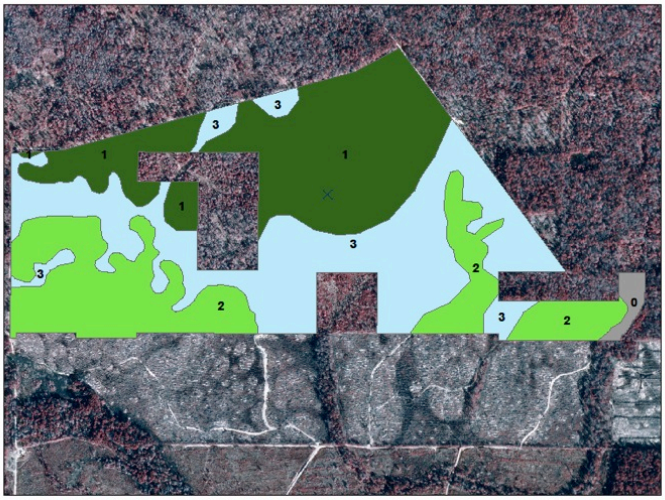
Test and Refine Keys against the Land

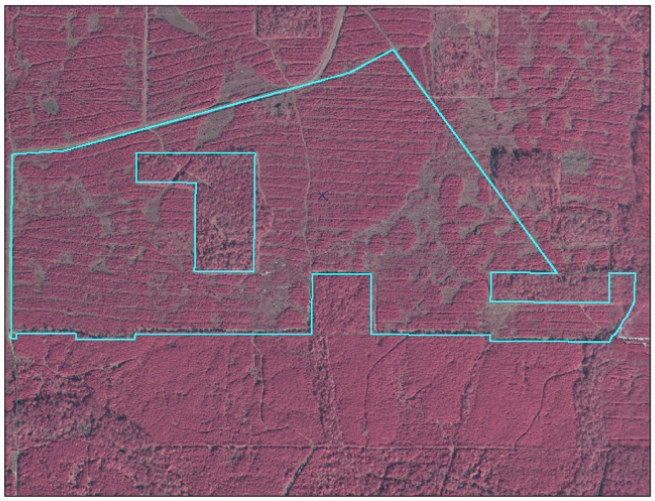


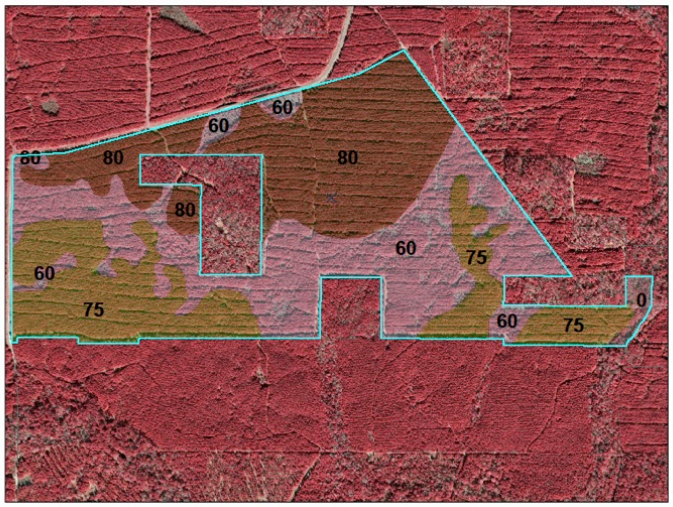


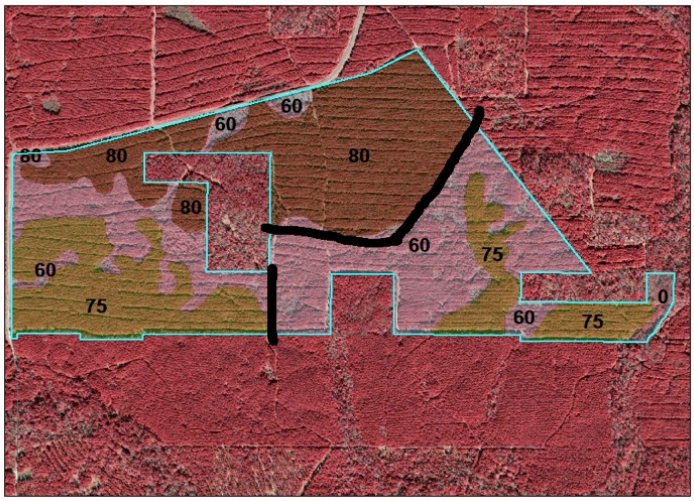
Tactics using Soil Maps

- Scenario
- Natural mixed stand is clearcut
- P-def wet flatwoods
- Owners objective is intensive production plantation forestry and to make money



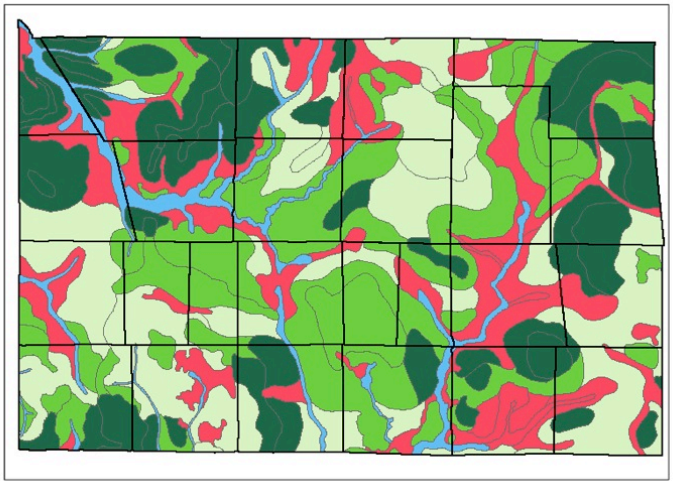


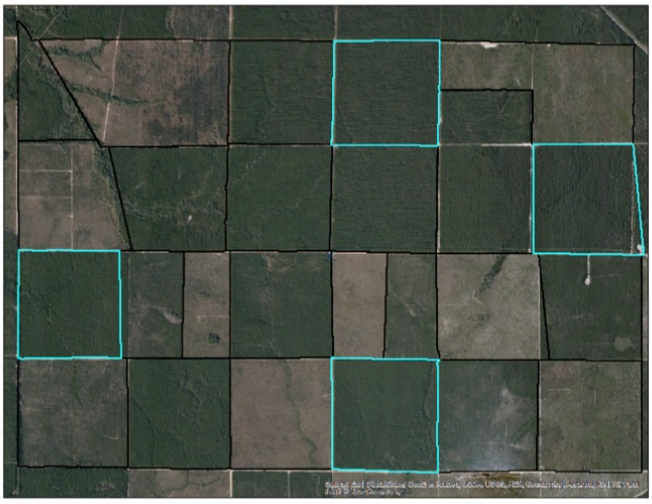


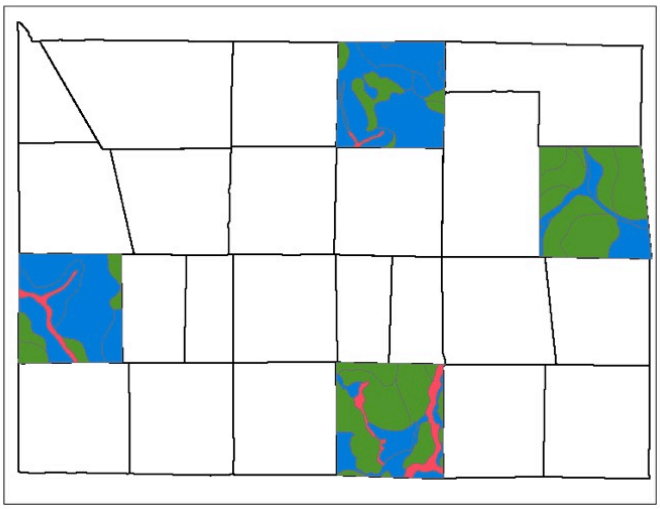


Allocation using Soil Maps

- Scenario
- Entity manages fairly uniform marginally P-def soil catena
- Historically uses slash without fertilization
- Strategic decision to put 25% into Lob







Allocation using Soil Maps

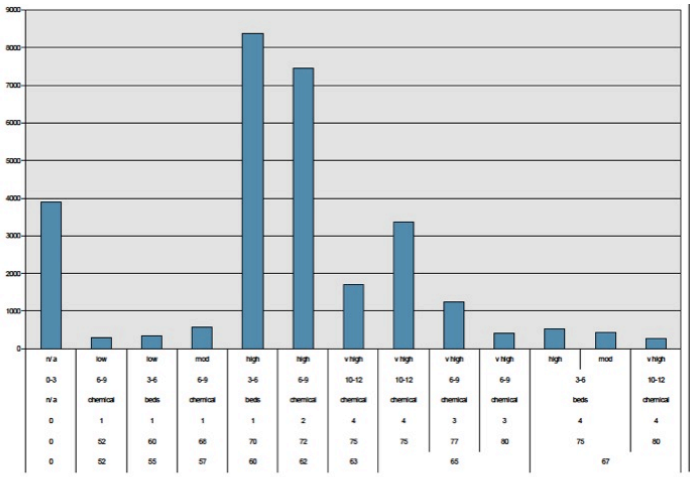
Species	Site Prep	Fertilization
420 acres slash	bed	P
200 acres of lob	Chem / machine plant	P
20 acres of SMZ		

Strategy using Soil Maps

- Scenario
- Entity wants to purchase 60K acres of privately owned land scattered across 5 GF / soil asso.
- 30K in mature natural pine stands lightly managed. 15K in hardwoods. 15 K in plantation management

Attributes of SMG's

Soil Management Group	Native productivity	Managed productivity	p-deficiency	site prep	operability	convertibility
UPLANDS						
Thick well drained upland	63	75	4	chemical	10-12	very high
Thin well drained upland	65	75	4	chemical	10-12	very high
Clayey p-def GF	62	72	2	chemical	6 - 9	high
Wet uplands	65	77	3	chemical	6 - 9	very high
FLATWOODS						
Dry Flatwoods	65	80	3	chemical	6 - 9	very high
Wet Flatwoods	60	70	1	beds	3-6	high
RIVERS & STREAMS						
High terrace hardwoods	n/a 0	n/a 0	0	n/a	0-3	n/a
Hardwood soils	n/a 0	n/a 0	0	n/a	0-3	n/a
Very wet hardwood	n/a 0	n/a 0	0	n/a	0-3	n/a
Well drained fluviatile	67	80	4	chemical	10-12	very high
Poorly drained fluviatile	67	75	4	beds	3-6	moderate
Flooding pine land	67	75	4	beds	3-6	high
MARGINAL SOILS						
Very wet marginal pine	55	60	1	beds	3-6	low
Very P-deficient GF	57	68	1	chemical	6 - 9	moderate
Catahoula badland	52	52	1	chemical	6 - 9	low



QUESTIONS?

- Different sources of soil maps
- Test the maps
- Make the maps work with SMG's and decision support keys
- Test and refine keys
- Use to make tactical, allocation, and strategic decisions